

January 1, 1776.

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P R O P O S A L S

For publishing by Subscription,

DEDICATED BY PERMISSION

T O T H E K I N G,

I S A A C I N E W T O N I

O P E R A

Q U Ä E X T A N T O M N I A,

COMMENTARIIS ILLUSTRATA,

OPERA ET STUDIO SAMUELIS HORSLEY, LL.D. SECY R. S.

CONDITIONS AND PLAN OF THE WORK.

I. THE Work will be printed on a royal quarto paper, the size and quality of this sheet, in a new type cast on purpose after the model of that used in the third edition of the PRINCPIA.

II. The whole will be comprised in five volumes. The first volume to contain all the Tracts in pure Mathematics, in the order in which they are here enumerated; viz.

1. *Arithmetica*

1. *Arithmetica Universalis, sive de Compositione et Resolutione Arithmeticâ Liber.*

2. *Analysis per aequationes numero terminorum infinitas.*

3. *Tractatus de quadraturâ curvarum.*

4. The posthumous Treatise of Fluxions.

5. *Methodus differentialis.*

6. *Commercium Epistolicum de variâ re Mathematicâ inter celeberrimos praesentis seculi Mathematicos, jussu Societatis Regiae in lucem editum, cum recensione præmissâ insignis Controversiæ inter LEIBNITIUM et KEILLIUM de primo Inventore Methodi Fluxionum.*

7. *Enumeratio Linearum tertii ordinis.*

This volume will also contain the posthumous piece *De Systemate Mundi*, and all the miscellaneous Papers dispersed in the Philosophical Transactions or elsewhere, except those which relate immediately to Light and Colours, or to subjects which seem particularly to connect them with the Treatise of Optics, or with some of the queries propounded in the conclusion of it.

The PRINCIPIA, with a Comment, will take up the second and third volume.

The Treatise of Optics, with the *Lectiones Opticæ*, and such of the miscellaneous papers as shall not have been inserted in the first volume, will compose the fourth.

The fifth will contain the Chronology; the Observations upon the Prophecies of DANIEL and the Apocalypse; with a short Narrative of all that can be collected, upon good authority, concerning the Life of Sir ISAAC NEWTON.

OF THE NOTES AND COMMENT.

The Tracts in pure Mathematics, although, except the Book of Quadratures, and the Enumeration of the Lines of the Third Order, they are all unfinished pieces, do not, however, require any length of Comment, for those who are previously well-founded in the three great branches of elementary institution; the *Geometry* of the Ancients, the *Logistics* of VIETA (that is, the Theory of Equations as delivered first of all by him, and afterwards by HARRIOT and OUGHTRED), and the *Cartesian Algebra of Curve Lines*. For such only the present publication is intended; in which, though no pains will be spared, to remove the difficulties which too frequently arise from our great Author's singular brevity, or the unfinished state of his writings, and in some instances from the abstruse nature of the subject; yet we cannot undertake to obviate that embarrassment, which a reader, who shall engage prematurely in sciences, of which he hath the elements to seek, will always feel from his own want of preparation.

The *Aritbmetica Universalis* will be accompanied with occasional Notes, and supplemental Dissertations; wherein such of the Newtonian improvements in common Algebra will be elucidated, as have not already been sufficiently explained by Mr. MACLAURIN, and other elementary writers. Geometrical Resolutions will be given of many of the problems which Sir ISAAC NEWTON hath chosen for his examples: and for a further specimen of the great advantages of the ancient analysis, which NEWTON so strenuously recommends, a Geometrical Tract will be subjoined, upon the Effection of Solid Problems; in which the constructions of cubic equations, and the solution of

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the problem of constructing any cubic equation by a given conic section, will be derived from geometrical principles after the manner of the ancients, without the least intervention of the algebraic *calculus*.

To the tracts upon Series and Fluxions will be prefixed, by way of general preface, Mr. ROBINS's Discourse concerning the Nature and Certainty of Sir ISAAC NEWTON's Method of Fluxions, and prime and ultimate *Ratios*. Mr. ROBINS was the first of Sir ISAAC NEWTON's interpreters, who had a right apprehension of his doctrine. He was the first who treated of the method of prime and ultimate *ratios* as distinct, as it really is, from the fluxional analysis; and shewed how nearly the former is allied to the ancient method of exhaustions; and how essentially both differ from the indivisibles of CAVALLERI, with which, after the examples of LEIBNITZ and BERNOULLI, many eminent men of this country as well as foreigners unwarily confounded it. In the book of quadratures, the demonstrations will be supplied where the Author hath omitted them; and to this piece will be subjoined, to compleat the doctrine of the comparison of curvilinear areas, a valuable Tract of the late learned Dr. PEMBERTON, intitled, *Epistola ad Amicum de Cotesii Inventis*; in which the extensive utility of Sir ISAAC NEWTON's rules is shewn by many judicious applications of them, and the principles are explained by which Mr. COTES arrived at the elegant *formulæ* delivered in his *Harmonia Mensurarum*: a work, perhaps the most extensively useful of any yet written upon the Inverse Method of Fluxions, except the book of quadratures itself. The enumeration of the lines of the third order will be accompanied with STIRLING's Illustration. All these pieces will be illustrated with occasional notes, either removing difficulties, or point-

ing out useful applications of Sir ISAAC NEWTON's rules, or improvements of his methods. These notes will contain the substance of many scattered papers of ROBINS, MACLAURIN, COTES, HALLEY, PEMBERTON, and others, the contemporaries, disciples, and friends of NEWTON. Much useful mathematics will thus be brought into an orderly arrangement, which at present, being loosely dispersed in unconnected parts, amidst a variety of other matter, in the Philosophical Transactions and other miscellaneous collections, lies either wholly forgotten, or greatly neglected.

Upon the PRINCPIA, a more regular and ample Comment is intended than upon the other writings; of which, however, elementary lessons will make no part. If any one should be so ill-advised, as to enter upon the Newtonian PRINCIPLES, before he is furnished with much more than the rudiments of mathematical knowledge, we would not amuse him with delusory promises of an assistance which, we are sensible, it is impossible to give. The best service we can render him is, to protest at once against the temerity of the attempt. To the wise maxim of the ancients we shall, throughout our work, inflexibly adhere, that no science is to concern itself with the proof of those preliminary points of knowledge, in which its reasonings originate, or of those intermediate steps through which its conclusions are deduced; having constantly observed, that those writers who profess to take up every thing from its first beginnings, and to adapt themselves to all capacities, always fail in the perspicuity they aim at. The primary properties therefore, of the Conic Sections, the known affections of the Logarithmic curve, and the first principles of Physicks and Astronomy, will have no place in our work. In such difficulties, and in such only, as properly belong to the Author or the Subject, the reader

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hath a right to the interpreter's assistance. To remove these, the deficient steps of the Newtonian demonstrations will be supplied; where any such are omitted as do not obviously present themselves. To facilitate the apprehension of general problems, the cases into which they sub-divide will be accurately distinguished. The limits of problems will be assigned; the practical application, of such as relate immediately to practice, will be exemplified; and every question of difficulty and importance, which is likely to arise in the mind of the intelligent reader, or which the Author himself suggests, will be discussed upon the principles the Author himself furnishes for its solution. Such an interpretation of the Newtonian text, with scientific details of the principal improvements and discoveries in Mathematical Physics, made since the time of NEWTON, by a successful application of his principles, will constitute the whole of our intended Comment on the *Principia*. In every part of which we shall adhere as much as possible to the geometrical style of the original, never taking the liberty to substitute algebraical calculations in the place of synthetic reasonings. In barely evincing the truth of his Author's assertions, an interpreter performs but a small part of his office; which is then only compleatly executed, when the Comment gives perspicuity, wherever it is wanting, to the Author's argument. The undertaking now announced to the Public, is of so different a nature from the celebrated work of LE SOEUR and JACQUIER, that the use and importance of it do not seem to be at all precluded by the valuable labours of those learned Fathers.

The Optical pieces are so written as to need little illustration. The Treatise of Optics, in particular, is for the most part easily intelligible, even to those who are but ordinary proficients in mathematical

thematical learning. To the fourth volume, however, it is proposed to prefix, the *Lectiones Opticae* of the learned Dr. BARROW, the immediate predecessor of NEWTON in the Lucasian Chair. These lectures NEWTON frequently refers to in his own Optical lectures, as the mathematical elements of Optics. He had a share in preparing them for the press, and some things in them are his own. The mathematical assertions that occur in the Treatise of Optics will, for the most part, be sufficiently explained by reference either to Dr. BARROW's lectures or Sir ISAAC NEWTON's. To this volume will be subjoined an account of the late improvements in Dioptrical Instruments, by Mr. DOLLOND's happy invention of Achromatic Glasses.

The Chronology will be accompanied with some few notes, chiefly respecting the date of the Trojan War, and the history of the Greek Sphere.

IV. Every piece will be published in the language in which it was originally written, or in which it appeared in the latest edition made in the Author's life, and under his own correction. The posthumous tracts will be published each in its original language, where the original can be found. The Notes and Comment will be every where in the language of the Text.

V. The Diagrams will be cut in the neatest manner, and printed on the page, as hath been usual in magnificent editions of mathematical works; except in the Optical volume, where the greater part of the schemes are of such a kind as must be engraved on copper. For the enumeration of the lines of the third order, we are furnished with the original plates, engraved for the elegant edition of that work by the late WILLIAM JONES, esq.; a favour which we owe to the son of that eminent mathematician, the

celebrated historian of Nadir Shah, a gentleman not less distinguished by his zeal for science in general than by his own great pre-eminence in many important branches.

VI. The work will be delivered to the Subscribers volume by volume as it shall be printed.

VII. The price to Subscribers will be five guineas for the whole in sheets. Two guineas to be paid at the time of subscribing; one guinea more upon the delivery of the second volume; and the remaining two guineas upon the delivery of the fifth.

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